PATENT APPLICATION

OF:

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FOR A:

STORAGE STRUCTURE

FIELD OF THE INVENTION

The present invention relates to the field of storage structures and is particularly concerned with a structure usable for simultaneously storing liquids therein and supporting a given entity thereon.

BACKGROUND OF THE INVENTION

An impressive volume of fluid waste or polluting fluid such as heating-oil or the like are created by our contemporary industrialized society each year. The automotive industry or heating fuel accounts for a large portion of these fluids.

Engines and power systems in automotive vehicles typically utilize fluids which needs to be changed periodically in order to reduce wear on the vehicle. Examples of such fluid include waste antifreeze, waste oil and the like.

Historically, waste engine oil has been disposed of in undeveloped areas or dumps. This practice in some cases, has resulted in contamination of underlying ground water and other disastrous environmental damages. Accordingly, some authorities have proposed or passed legislation requiring that waste oil be brought to centralized locations, such as service stations for holding and eventually recycling. In many cases though, compliance with such statutes has proven to be disappointing since service stations often lack proper facilities for holding waste engine oil. Some service stations even tend to discourage persons who change their own oil from using their limited storage facilities.

Also, in recent years, significant levels of concern have been raised over the use of below-ground liquid storage vessels, such as tanks. Problems arise when the vessels begin to leak due to corrosion and the like, allowing a stream of material to leak into the surrounding soil. The problems are sometimes compounded by the fact that detection sometimes does not occur before relatively long periods of time.

After entering the soil, these material percolate downward into, for example ground water supplies. Again, this represents a clear environmental danger.

Modifying underground vessels to be environmentally safe is relatively expensive. Monitoring and repairing of underground vessels is also expensive and complex. As a consequence, above-ground storage vessels are becoming more frequently used. By using an above-ground storage tank, it is possible to more closely monitor leaks primarily because the tank is fully visible. Furthermore, the tank is less likely to leak in the first instance because it is maintained with paint and the like. Still furthermore, leak management may prove to be considerably less expensive in above-ground storage vessel situations.

However, above-ground storage vessels nevertheless suffer from some drawbacks. One of the major drawback relates to the amount of space required for the above-ground storage vessels. As mentioned previously, even dedicated locations such as service stations often lack proper facilities for holding liquid waste, such as waste engine oil. Accordingly, it would be desirable to provide a structure allowing for above-ground storage of liquid waste while reducing the amount of fluid space and being yet aesthetically pleasing. This last aspect is very important to circumvent the municipal reglementation related to heating-oil tank. Hence, it would prove to be highly desirable to provide an above-ground storage tank capable of being used for another purpose such as for acting as a support structure.

It is an object of the present invention to provide a combination liquid storage and entity supporting structure. Advantages of the present invention include that the proposed storage tank is specifically designed so as to be useable in an above-ground setting so as to circumvent disadvantages associated with below-ground storage vessels. Also, the proposed structure reduces the space fluid associated with conventional above-ground storage vessels by providing a structure that can be used for serving both as a tank and as an aesthetic supporting structure. More specifically, the proposed structure is designed so as to be useable both as a storage tank and as a stair, a balcony, a combination of stairs and balcony or similar structures.

The proposed structure is designed so as to allow for safe storage of potentially hazardous liquids, such as gasoline, heating-oil, waste-oil, pesticides, windshield washing fluid and a myriad of other liquid products with reduced risks of leakage and/or evaporation. Furthermore, the proposed device is optionally provided with adequate venting and drainage components so as to ensure proper handling of the waste material. Still furthermore, the proposed device is designed so as to be manufacturable using conventional forms of manufacturing and conventional material so as to provide a combination storage tank/support structure that will be economically feasible, long lasting and relatively trouble free in operation.

In accordance with the present invention, there is provided a storage structure for being used both as a container for storing a liquid and as a supporting structure for supporting an entity, the storage structure comprising: a base wall, a substantially opposed top wall and a peripheral wall extending between the base and top walls, the base, top and peripheral walls together forming a liquid tight platform enclosure encompassing a liquid storing volume; an inlet aperture and an outlet aperture both extending through the platform enclosure substantially adjacent respectively to the top wall and the base wall, the inlet and outlet apertures both establishing fluid communication between the liquid storing volume

and the exterior of the platform enclosure for respectively allowing filling and emptying of the liquid storing volume; an inlet aperture obstructing means and an outlet aperture obstructing means operatively coupled respectively to the inlet and outlet apertures for allowing selective sealing obstruction respectively of the inlet and outlet apertures; the platform enclosure being configured, sized and made of a suitable material for allowing the platform enclosure to act both as a container for substantially sealingly storing the liquid and as a supporting structure for stably supporting thereon the entity.

Typically, the storage structure further comprises a venting aperture extending through the platform enclosure substantially adjacent to the top wall for allowing venting of the liquid storing volume.

Conveniently, the storage structure further comprises a venting tube attached to the platform enclosure in fluid communication with the venting aperture, the venting tube defining a venting tube distal end located substantially away from the platform enclosure, the venting tube distal end having substantially the configuration of an inverted "J"-shaped hook.

Typically, the storage structure further comprises a gauge means operatively coupled to the liquid storing volume for providing information on the quantity of the liquid stored in the liquid storing volume.

Conveniently, the storage structure further comprises a separating aperture extending through the platform enclosure, the separating aperture being configured, sized and positioned relative to the outlet aperture so as to allow the separating and discharge apertures to selectively discharge therethrough liquids of different densities; whereby the separating aperture allows for the selective discharge therethrough of a liquid having a higher density then that discharged through the discharge aperture and whereby the discharge aperture allows for the

selective discharge therethrough of a liquid of lower density then that discharged through the separating aperture.

Typically, the top wall is configured and sized for allowing an intended user to stand thereon.

Conveniently, the storage structure further comprises a stair section operatively coupled to the platform enclosure so as to allow the intended user to use the stair section for moving between a base position located substantially in register with the level of the base wall and platform position wherein the intended user stands on the top wall.

In at least one embodiment of the invention, the stair section is releasably coupled to the platform enclosure.

In at least one embodiment of the invention, the stair section defines a stair enclosure for storing a portion of the liquid.

In at least one embodiment of the invention, the stair enclosure is in fluid communication with the platform enclosure.

In at least one embodiment of the invention, the peripheral wall defines a front section, a rear section and a pair of side sections, the front section defining at least one substantially horizontal step portion and at least one substantially vertical spacing portion for forming at least part of the stair section.

In at least one embodiment of the invention,the rear section extends at an angle relative to the base and top walls.

Conveniently, the storage structure further comprises at least one leg attachment structure extending substantially outwardly from the rear section and at least one supporting leg extending substantially downwardly from the at least one leg attachment structure for supporting the storage structure.

Typically, the peripheral wall defines a front section, a rear section and a pair of side sections, the front section extending at an angle relative to the base and top walls; the storage structure further including a stair adaptor mounted on the front section, the stair adaptor defining at least one substantially horizontal step portion and at least one substantially vertical spacing portion for forming at least part of the stair section.

In at least one embodiment of the invention, the rear section extends at an angle relative to the base and top walls.

In at least one embodiment of the invention, the storage structure further comprises at least one leg attachment structure extending substantially outwardly from the rear section and at least one supporting leg extending substantially downwardly from the at least one leg attachment structure for supporting the storage structure.

In at least one embodiment of the invention, the storage structure further comprises a handrail attachment means extending therefrom for allowing the releasable attachment thereto of a handrail.

In at least one embodiment of the invention, the storage structure further comprises a peripheral frame, the peripheral frame including channel members assembled in an end-to-end relationship with each other.

Conveniently, the storage structure further comprises at least one internal wall for dividing the platform enclosure into at least two distinct enclosure sections.

In accordance with the present invention, there is also provided a storage structure for being used both as a container for storing a liquid and as a supporting structure for supporting an entity, the storage structure comprising: a base wall, a substantially opposed top wall and a peripheral wall extending between the base and top walls, the base, top and peripheral walls together forming a liquid tight platform enclosure encompassing a liquid storing volume; the peripheral wall defining a stair extending between the base and top walls; an inlet aperture and an outlet aperture both extending through the platform enclosure substantially adjacent respectively to the top wall and the base wall, the inlet and outlet apertures both establishing fluid communication between the liquid storing volume and the exterior of the platform enclosure for respectively allowing filling and emptying of the liquid storing volume; an inlet aperture obstructing means and an outlet aperture obstructing means operatively coupled respectively to the inlet and outlet apertures for allowing selective sealing obstruction respectively of the inlet and outlet apertures; the platform enclosure being configured, sized and made of a suitable material for allowing the platform enclosure to act both as a container for substantially sealingly storing the liquid and as a supporting structure for stably supporting thereon the entity.

BRIEF DESCRIPTION OF THE DRAIWNGS

Various embodiments of the present invention will now be disclosed, by way of example, in reference to the following drawings in which:

Figure 1, in a perspective view, illustrates a storage structure in accordance with an embodiment of the present invention;

Figur 2, in a perspective view, illustrates a storage structure in accordance with an alternative embodiment of the present invention;

Figure 3, in a perspective view, illustrates a storage structure in accordance with another alternative embodiment of the present invention;

Figure 4, in a perspective view, illustrates a storage structure in accordance with yet another embodiment of the present invention;

Figure 5, illustrates a storage structure in accordance with yet still another embodiment of the present invention;

Figure 6, in a cross-sectional view taken along arrows a-a of Fig. 5, illustrates some of the features of the embodiment shown in Fig. 5;

Figure 7, in a perspective bottom view, illustrates some of the features of the embodiment shown in Fig. 5 and 6;

Figure 8, in a perspective view with sections taken out, illustrates some of the features of the embodiment shown in Figs. 5 through 7;

Figure 9, in a perspective view with sections taken out, illustrates a storage structure in accordance with yet still another embodiment of the present invention; and

Figure 10, in a perspective view with sections taken out, illustrates a storage structure with yet still a further embodiment of the present invention.

Figure 11, in a perspective view with sections taken out, illustrates a storage structure with yet still a further embodiment of the present invention.

DETAILED DESCRIPTION

Referring to Fig. 1, there is shown a storage structure 10 in accordance with an embodiment of the present invention. The storage structure 10 is intended to be used both as a container for storing a liquid and as a supporting structure for supporting an entity. The storage structure 10 may be used for storing various types of liquids such as grease-oil, gasoline, waste antifreeze, liquid pesticides, waste-water and any other suitable liquid without departing from the scope of the present invention. Typically, the container provides a safe and environmentally sound storage area for holding such products.

The storage structure is also intended to be used for supporting an entity thereon. The entity may take any suitable form such as any suitable object or any suitable living being such as a human being. Typically, the storage structure takes the form of a platform for supporting at least one intended user while also containing the waste fluid. The storage structure could assume any suitable configuration such as that of a balcony, a patio or any other supporting platform without or without steps attached thereto without departing from the scope of the present invention.

The storage structure 10 includes a base wall 12, a substantially opposed top wall 14 and a peripheral wall 16 extending between the base and top walls 12, 14. The base, top and peripheral walls 12, 14, and 16 together form a liquid-tight enclosure encompassing a liquid storing volume. In the embodiment shown in Fig. 1, the peripheral wall 16 defines a front section 18, a rear section 20 and a pair of side sections 22 extending therebetween (only one of which is shown in Fig. 1). It should, however, be understood that the peripheral wall 16 could assume any suitable configuration without departing from the scope of the present invention.

Also, in the embodiment shown in Fig. 1, the storage structure 10 further includes a stair section 24 operatively coupled to the platform enclosure so as to allow an intended user to use the stair section 24 for moving between the base position located substantially in register with the level of the base wall 12 and a platform position wherein the intended user stands on the top 14. The stair section 24 defines at least one and preferably a set of substantially horizontal step portions 26 and at least one and preferably a corresponding set of substantially vertical spacing portions 28 for forming at least part of the stair section 24.

The storage structure 10 also includes an inlet aperture 30 and an outlet aperture 32 both extending through the platform enclosure substantially adjacent respectively to the front wall 14 and the base wall 12. Typically, the inlet aperture 30 extends through the top wall 14 while the outlet aperture 32 extends through one of the side portions 22 adjacent the base wall 12. The inlet and outlet apertures 30, 32 both establish fluid communication between the liquid storing volume and the exterior of the platform enclosure for respectively allowing the filling and emptying of the liquid storing volume.

The storage structure typically further includes an inlet aperture obstructing means and an outlet aperture obstructing means operatively coupled respectively to the inlet and outlet apertures 30, 32 for allowing selective sealing obstruction respectively of the inlet and outlet apertures 30, 32. In the embodiment shown in Fig. 1, the inlet aperture obstructing means includes an inlet duct 34 hydraulically coupled to the inlet aperture 30 and provided with a duct closing cap 36. The inlet duct 34 is typically releasably coupled to the inlet aperture 30 using conventional releasably attachment means such as a threaded connection. The outlet aperture obstructing means typically takes the form of an outlet valve 36 operatively mounted over the outlet aperture 32. It should, however, be understood that both the inlet and outlet obstructing means may take any suitable form without departing from the scope of the present invention.

The platform enclosure is configured, sized and made out of a suitable material for allowing the platform enclosure to act both as a container for substantially sealingly storing a liquid and as a supporting structure for stably supporting thereon an entity. The platform enclosure may be made out of any suitable material such as steel, stainless steel, aluminum, a suitable polymeric resin or the like. Typically, although by no means exclusively, the exterior surface of the platform enclosure is primer-coated and painted with a final coat of rust-resistant enamel. It should, however, be understood that the platform enclosure may be made out of any other suitable material without departing from the scope of the present invention.

Typically, the storage structure 10 further includes a venting aperture 38 extending through the platform enclosure typically substantially adjacent to the top wall 14 for allowing venting of the liquid storing volume. Typically, although by no means exclusively, the venting aperture 38 extends through the top wall 14. Also, typically, the storage structure is further provided with a venting tube 40 attached to the platform enclosure in fluid communication with the venting aperture 38. The venting tube 40 typically defines a venting tube distal end 42 located substantially away from the platform enclosure. The venting tube distal end 42 typically has substantially the configuration of an inverted J-shaped hook. It should, however, be understood that the venting tube 40 may have any suitable configuration without departing from the scope of the present invention.

The storage structure 10 is typically further provided with a gauge means operatively coupled to the liquid storing volume for providing information on the quantity of liquid stored within the liquid storing volume. In the embodiment shown in Fig. 1, the gauge means includes a gauge component 44 mounted on the top 14. The gauge component 44 is shown positioned adjacent an auxiliary aperture 46 also extending through the top 14.

The storage structure 10 typically further inncludes a set separating aperture 48 extending through the platform enclosure. The separating aperture 48 is configured, sized and positioned relative to the outlet aperture 32 so as to allow the separating and discharge apertures 48, 32 to selectively discharge therethrough liquid of different densities. The separating aperture 48 is provided with a separating valve 50 mounted thereto. Typically, the separating aperture 48 allows for the selective discharge therethrough of a liquid having a higher density than that discharge through the discharge aperture 32 while the discharge aperture 32 allows for the selective discharge therethrough of a liquid of lower density than that discharged through the separating aperture 48. For example, the separating aperture 48 may be used for draining water from the liquid storing enclosure when the latter is used for storing lighter density liquids such as oil or the like.

The storage structure 10 shown in Fig. 1 further includes a handrail attachment means extending therefrom for allowing releasable attachment thereto of a handle. The handrail attachment means is formed of attachment brackets 52 extending from the side portion 22. It should, however, be understood that the handrail attachment means may take any suitable form without departing from the scope of the present invention. Typically, the handrail attachment means is configured and sized for allowing attachment thereto of a conventional handrail for preventing an intended user from falling off the storage structure 10.

Referring now more specifically to Fig. 2, there is shown a storage structure 54 in accordance with an alternative embodiment of the invention. The storage structure 54 is substantially similar to the storage structure 10 shown in Fig. 10 and, hence, similar reference numerals will be used to denote of the components. One of the main differences between the storage structures 54 and 10 resides in a configuration of the rear section 20. The rear section 20 of the supporting structure 54 extends at an angle relative to the base and top walls 12, 14 whereas the rear section 20 of the storage structure 10 extends generally

perpendicularly relative to both the base and top walls 12, 14. Although the rear section 20 of the supporting structure 54 is shown as extending substantially at 45 degrees relative to the base and top walls 12, 14, it should be understood that the rear section 20 can extend at other angular relationships relative to the base and top walls 12, 14 without departing from the scope of the present invention.

Also, the supporting structure 54 further includes at least one, and typically two leg attachment structures 56 extending substantially outwardly from the rear section 20. The supporting structure 54 further also includes at least one, and typically four supporting legs 58 extending substantially downwardly from corresponding leg attachment structures 56 for supporting the storage structure 54. In the embodiment shown in Fig. 2, the leg attachment structures 56 have a substantially L-shaped cross-sectional configuration. It should, however, be understood that the leg attachment structures 56 could have other configurations without departing from the scope of the present invention.

Referring now more specifically to Fig. 3, there is shown a storage structure 60 in accordance with yet another alternative embodiment of the invention. The storage structure 60 is substantially to that shown in Figs. 1 and 2 and, hence, similar reference numerals will be used to denote similar components. One of the main differences between the supporting structure 60 and the supporting structures 10 an 54 resides in the configuration of the front section 18. The front section 18 of supporting structure 60 has a substantially flat configuration whereas the front section 18 of both the supporting structures 10 and 54 is bent so as to define the step and spacing portions 26, 28. The supporting structure 60 further includes a stair adapter 62 mounted on the front section 18. The stair adapter 62 defines at least one and preferably a set of horizontal step portions 26 and at least one and preferably a corresponding set of substantially vertical spacing portions 28 for forming at least part of the stair section 24. Hence, while the step and spacing portions 26, 28 of the supporting structures 10 and 54 are formed integrally by the

front section 18, the step and spacing portions 26, 28 of the supporting structure 60 are part of a stair adapter 62 mounted over the front section 18.

Referring now more specifically to Fig. 4, there is shown a storage structure 64 in accordance with yet another alternative embodiment of the invention. The storage structure 64 is substantially similar to the storage structures 10, 54, and 60 and, hence, similar reference numerals will be used to denote some of the components. One of the main differences between the supporting structure 64 shown in Fig. 4 and the supporting structures 10, 54, and 60 shown respectively in Figs. 1, 2, and 3 resides in that the stair sections 24 of the storage structures 10 and 54 define a single platform enclosure, the storage structure 64 defines both a platform enclosure and a distinct stair enclosure 66 encompassing the distinct liquid storing volume. The platform and stair enclosures are hence made out of distinct sections separable from each other. The platform and stair enclosures may be put in fluid communication with each other or not depending on the needs of an intended user. Also, the platform and stair enclosures may be made out of similar or different materials without departing from the scope of the present invention.

In the embodiment shown in Fig. 4, the stair enclosure 66 defines a stair rear section 68 and a pair of stair side sections 70 (only one of which is shown in Fig. 4).

Referring now more specifically to Figs. 5 through 8, there is shown a storage structure 72 in accordance with yet still another embodiment of the present invention. The storage structure 72 similar to the storage structures 10, 54, 60, and 64 shown respectively in Figs. 1, through 4 and, hence, similar reference numerals will be used to denote similar components.

One of the main differences between the storage structure 72 and the storage structures 10, 54, 60, and 64 resides in that the storage structure 72 is deprived of a stair section 24 and is intended to be used as as a supporting structure such as a balcony, a platform or the like. In the embodiment shown in Figs. 5 through 8, the storage structure has a substantially parallelepiped-shaped configuration although the storage structure could have other configurations without departing from the scope of the present invention.

Also the storage structure 72 includes at least one and preferably a set of partitioning internal walls for dividing the platform enclosure into at least two and preferably a set of distinct enclosure sections. As shown more specifically in Figs. 6 and 8, the storage structure 72 typically includes a plurality of substantially vertical internal partitioning walls 74 and at least one substantially horizontal partitioning wall 76. The separating or partitioning walls 74, 76 are intended to separate distinct enclosure sections 78 formed therebetween. Hence, the enclosure may form main and auxiliary reservoirs and/or may be provided with double-plated walls for security reasons or otherwise.

Typically, the vertical partitioning wall 74 may be made out of channel members or other similar components or any other suitable component without departing from the scope of the present invention.

Typically, the storage structure 72 includes a peripheral frame 80. The peripheral frame 80 is typically made out of channel members 82 assembled together in an end-to-end relationship relative to each other. In at least one embodiment of the invention, the storage structure 72 is made out of channels and plates assembled together by welding or other suitable attachment means.

As illustrated more specifically in Fig. 7, the base wall 12 is typically provided with base recesses 83 formed therein for capturing drainage liquid. Also,

as illustrated in Fig. 7, the storage structure 72 may be mounted legs 58 using suitable leg-to-base wall attachment means such as channels 84 mounted between the base wall 12 and the legs 58.

Referring now more specifically to Fig. 9, there is shown a storage structure 86 in accordance with yet still a further embodiment of the present invention. The storage structure 86 is substantially similar to the storage structure 72 shown in Figs. 5 through 8 and, hence, similar reference numerals will be used to denote similar components. One of the main differences between the storage structures 72 and 86 resides in that the peripheral frame 80 in the storage structure 86 is made out of substantially U-shaped channels having their respective flanges 88 extending inwardly and assembled together in an end-to-end relationship relative to each other whereas the peripheral frame 80 of the storage structure 72 is typically made out of substantially hollowed out rectangular channels 82.

Referring now more specifically to Fig. 10, there is shown a storage structure 90 in accordance with yet still a further embodiment of the present invention. The storage structure 90 is similar to the storage structures 72 and 86 shown respectively in Figs. 5 through 8 and 9 and, hence, similar reference numerals will be used to denote similar components. One of the main differences between the storage structures 86 and 90 resides in that the peripheral frame 80 of the storage structure 90 is provided with channels having corresponding channel flanges oriented generally outwardly instead of inwardly.

Referring now more specifically to Fig. 11, there is shown a storage structure 92 in accordance with yet still a further embodiment of the present invention. The storage structure 92 is similar to the storage structures 72, 86 and 92 shown respectively in Figs. 5 through 8, 9 and 10 and, hence, similar reference numerals will be used to denote similar components. One of the main differences between the storage structures 90 and 92 resides in that the top plate is provided with flanges 94 extending therefrom.

All embodiments of the invention, the top wall 14 may be covered with a suitable covering layer such as a layer of cement, carpet, wood, fibreglass or any other suitable material typically providing friction enhancing and wear-resistant characteristics.